

PHILOSOPHICAL TRANSACTIONS.

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The CONTENTS.

A Supplement to what was publish'd N. 73. of the Compression of Air under Water. An Answer to Four Papers of Mr. Hobs, lately publish'd. New Observations of Spots in the Sun. An Account touching Vegetable Excrecencies. A Description of some Books: I. & II. Lectiones OPTICÆ & GEOMETRICÆ, Auth. Maaco Barrow; together with a Mantissa of the same Author to some of those Lectures. III. A Continuation of the MEMOIRES of M. Bernier concerning the Empire of the G. Mogol. IV. Historia & Meteorologia INCENDII ÆTNÆI. A. 1669. Auth. Joh. Alph. Borello. Advertisement touching the Latin Version of part of these Transactions.

A Supplement to what was publish'd N. 73. of the Compression of Air under Water.

AT the desire of a particular Friend, the Scheme in Tab. I. Fig. I. was drawn, and is now permitted to be made publick at the request of another, by way of Supplement to what was said in the *Philosophical Transactions* N. 73. of the Compression of Air under Water: In which Figure

ED is made to represent the Tube, = x.

AB the distance of the upper part of the Tube from the surface of the water above or under it, = b.

FC the depth of the water from its surface to the bottom of the Air within the Tube, = a.

BC that part of it which remains fill'd with Air within the Water.

CD the rest thereof which is full of water.

N n n

And

And any two of the three first, x, b , and a , being given, the other is known, and consequently the rest also.

For, if by the incumbent weight of 33 feet depth in water, the Air in the tube is compressed into half the space it fill'd before; then the said 33 feet depth of Water equals the weight or pressure of the incumbent Air on the surface of the Water.

Now, as the weight or pressure of the Air on the surface of the Water, is to the Depth of the Water from the surface thereof to the bottom of the Air within the Tube; so is the Length of the Tube fill'd with Air, to the length thereof fill'd with Water: That is, according to the said Experiments, putting z for 33, or whatever, at other times or places, shall be found to be the weight or pressure of the incumbent Air on the surface of the Water, (for it is not always the same exactly;) $z. a :: a \pm b. \frac{a^2 \pm ab}{z} = CD.$

And therefore $\frac{a^2 \pm ab + za \pm zb}{z} = x.$

Wherefore $\frac{z}{z+a} x - a = b.$

And $\therefore \frac{b^2 \mp z b + z^2 + 4 z x : \mp b - z}{z} = a.$

And therefore a and b being given, x is known to be the first equation; And a and x being given, b is known by the second; And b and x being given, a is known by the third.

The Horizontal line $BFBAF$ is substituted for $GABEFb$, when the Close end of the Tube is not even with the surface of the Water, to avoid the breach $cC = bB = \frac{1}{4} b^2$ in the length of the Tube.

Note,

That the Perpendicular immersion of the Tube or Cylinder, spoken of in the said *Transactions* N. 73. is not to be understood of the Depth of the bottom or open end in the water, but of the Depth of the Air within the Tube or Cylinder from the surface of the water, viz. FC , not FD .

Fig. I.

